Small-Boat Sailing Merit Badge

Student Workbook

Camp Bob Hardin
Summer 2015

Small-Boat Sailing Merit Badge Requirements

1. Do the following:
   a. Explain first aid for injuries or illnesses that could occur while small-boat sailing, including hypothermia, dehydration, heat reactions, motion sickness, cuts, scratches, abrasions, contusions, puncture wounds, and blisters.
   b. Identify the conditions that must exist before performing CPR on a person, and explain how to recognize such conditions. Demonstrate proper technique for performing CPR using a training device approved by your counselor.

2. Before doing the following requirements successfully complete the BSA swimmer test.

3. Describe the boat you will be using for the sailing requirement, naming all of the major parts and the function of those parts. *

4. Before going afloat, do the following:
   a. Discuss the nine points of the BSA Safety Afloat plan.
   b. Explain the rules of the road in general and any specific rules or laws that apply to your area or state.
   c. Explain how water conditions, the hazards of weather, and heavy winds can affect both safety and performance in sailing.
   d. Discuss the warning signs of inclement weather and what to do should heavy winds develop or a storm approach.
   e. Prepare a typical float plan.
   f. Discuss the proper clothing, footwear, and personal gear required for small-boat sailing in warm weather and in cool weather. Explain how choosing the proper clothing, footwear, and personal gear will help keep you comfortable and safe while sailing.

5. Discuss with your counselor how to identify the wind direction and wind indicators. Explain the importance of this task before setting sail.

6. Following the BSA Safety Afloat plan, show that you and a buddy can sail a boat properly. Do the following:
   a. Prepare a boat for sailing, including a safety inspection.
   b. Get underway from a dock, mooring, or beach.
   c. Properly set sails for a round-trip course approved by your counselor that will include running, beating, and reaching the basic points of sail. While sailing, demonstrate good helmsmanship skills.
   d. Change direction by tacking; change direction by jibing.
   e. Demonstrate getting out of irons.
   f. Demonstrate the safety position.
   g. Demonstrate capsize procedures and. the rescue of a person overboard.**
   h. Demonstrate the procedure to take after running aground.
   i. Upon returning to the dock, mooring, or beach, properly secure all equipment, furl or stow sails, and prepare the craft for unattended docking or beaching overnight or longer.

7. Demonstrate a working knowledge of marlinespike seamanship. Do the following:
   a. Show how to tie a square (reef) knot, clove hitch, two half hitches, bowline, cleat hitch, and figure eight knot. Demonstrate the use of each.
   b. Show how to heave a line, coil a line, and fake down a line.
   c. Discuss the kinds of lines used on sailboats and the types of fibers used in their manufacture. Explain the advantages and disadvantages of each.

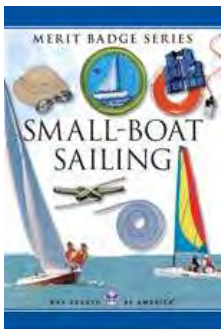
8. Describe how you would care for and maintain a sailboat and its gear throughout the year.

9. With your counselor, review sailing terminology and the points of sail. Discuss various types of sailboats in use today and explain their differences.

* The skill may be demonstrated on any boat available to the Scout; sailboards are not acceptable. While no specific sail plan is recommended, it is suggested that the craft be smaller than 20 feet. The boat must be capsizable and have the capability of sailing to windward.

** Capsize procedures should be conducted under the close supervision of the counselor. A rescue boat should be standing by to assist, if necessary, and to tow the capsized craft to shore. Self-bailing boats are acceptable for this requirement. Extreme care should be taken to avoid personal injury and damage to the boat or equipment.

Resources



BSA Supply No. 35950

Websites
http://www.scouting.org/scoutsource/BoyScouts/AdvancementandAwards/MeritBadges/mb-SMBS.aspx

http://meritbadge.org/wiki/index.php/Small-Boat_Sailing#Notes

http://usscouts.org/mb/worksheets/Small-boat-sailing.pdf

Merit Badge Counselor

Major Bill Beers
Skipper Sea Scout Ship Lake Wylie (Ship 427)
4743 Cascade Avenue
Rock Hill, SC 29732
(803) 389-5124
beersbill@gmail.com

Small-Boat Sailing

Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in ***Boy Scout Requirements*** (Pub. 33216 – SKU 34765).

The requirements were last issued or revised in 2005 • This workbook was updated in June 2012.

Scout's Name:_____ Unit: _____

Counselor's Name: _____ Counselor's Phone No.: _____

http://www.USScouts.Org • http://www.MeritBadge.Org

Please submit errors, omissions, comments or suggestions about this **workbook** to: Workbooks@USScouts.Org
Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: Merit.Badge@Scouting.Org

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1. Do the following:

   a. Explain first aid for injuries or illnesses that could occur while small-boat sailing, including hypothermia, dehydration, heat reactions, motion sickness, cuts, scratches, abrasions, contusions, puncture wounds, and blisters.

      Hypothermia:_____

      _____

      Dehydration: _____

      _____

      Heat reactions: _____

      _____

      Motion sickness: _____

      _____

      Cuts: scratches: abrasions: contusions: _____

      _____

      Puncture wounds: _____

      _____

      Blisters: _____

      _____

   b. Identify the conditions that must exist before performing CPR on a person, and explain how to recognize such conditions. _____

      _____

      _____

      _____

      _____

      ☐ Demonstrate proper technique for performing CPR using a training device approved by your counselor.

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☐ 2. Before doing the following requirements, successfully complete the BSA swimmer test.

3. Describe the boat you will be using for the sailing requirement, naming all of the major parts and the function of those parts.*
** The skills may be demonstrated on any boat available to the Scout; sailboards are not acceptable. While no specific sail plan is recommended, it is suggested that the craft he smaller than 20 feet. The boat must be capsizable and have the capability of sailing to windward.*

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4. Before going afloat, do the following:

a. Discuss the nine points of the BSA Safety Afloat plan.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

b. Explain the rules of the road in general and any specific rules or laws that apply to your area or state. _____
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c. Explain how water conditions, the hazards of weather, and heavy winds can affect both safety and performance in sailing.

Water conditions: _____
_____
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Hazards of weather: _____

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Heavy winds:_____

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d. Discuss the warning signs of inclement weather and what to do should heavy winds develop or a storm approach.

Warning signs: _____

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What to do:_____

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e. Prepare a typical float plan. _____

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f. Discuss the proper clothing, footwear, and personal gear required for small-boat sailing in warm weather and in cool weather.

Warm weather _____

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Cool weather. _____

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Explain how choosing the proper clothing, footwear, and personal gear will help keep you comfortable and safe while sailing. _____

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5. Discuss with your counselor how to identify the wind direction and wind indicators. _____

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Explain the importance of this task before setting sail. _____

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6. Following the BSA Safety Afloat plan, show that you and a buddy can sail a boat properly. Do the following:

- ☐ a. Prepare a boat for sailing, including a safety inspection.
- ☐ b. Get underway from a dock, mooring, or beach.
- ☐ c. Properly set sails for a round-trip course approved by your counselor that will include running, beating, and reaching—the basic points of sail. While sailing, demonstrate good helmsman ship skills.
- ☐ d. Change direction by tacking; change direction by jibing.
- ☐ e. Demonstrate getting out of irons.
- ☐ f. Demonstrate the safety position.
- ☐ g. Demonstrate capsize procedures and the rescue of a person overboard.†
  †*Capsize procedures should he conducted under the close supervision of the counselor. A rescue boat should be standing by to assist, if necessary, and to tow the capsized craft to shore. Self-bailing boats are acceptable tom- this requirement. Extreme care should be taken to avoid personal injury and damage to the boat or equipment.*
- ☐ h. Demonstrate the procedure to take after running aground.
- ☐ i. Upon returning to the dock, mooring, or beach, properly secure all equipment, furl or stow sails, and prepare the craft for unattended docking or beaching overnight or longer.

7. Demonstrate a working knowledge of marlinespike seamanship. Do the following:

   a. Show how to tie a square (reef) knot, clove hitch, two half hitches, bowline, cleat hitch, and figure-eight knot.

   - ☐ square (reef) knot
   - ☐ clove hitch
   - ☐ two half hitches
   - ☐ bowline
   - ☐ cleat hitch
   - ☐ figure-eight knot

Demonstrate the use of each.

- ☐ square (reef) knot
- ☐ clove hitch
- ☐ two half hitches
- ☐ bowline
- ☐ cleat hitch
- ☐ figure-eight knot

b. Show how to heave a line, coil a line, and fake down a line.

c. Discuss the kinds of lines used on sailboats and the types of fibers used in their manufacture. Explain the advantages and disadvantages of each.

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8. Describe how you would care for and maintain a sailboat and its gear throughout the year. _____

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9. With your counselor, review sailing terminology and the points of sail. _____

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Discuss various types of sailboats in use today and explain their differences. _____

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Requirement resources can be found here:
http://www.meritbadge.org/wiki/index.php/Small-Boat Sailing#Requirement resources

SAFETY AFLOAT

BSA groups shall use Safety Afloat for all boating activities. Adult leaders supervising activities afloat must have completed Safety Afloat training within the previous two years. Cub Scout activities afloat are limited to council or district events that do not include moving water or float trips (expeditions). Safety Afloat standards apply to the use of canoes, kayaks, rowboats, rafts, floating tubes, sailboats, motorboats (including waterskiing), and other small craft, but do not apply to transportation on large commercial vessels such as ferries and cruise ships. Parasailing (being towed airborne behind a boat using a parachute), kitesurfing (using a wakeboard towed by a kite), and recreational use of personal watercraft (small sit-on-top motorboats propelled by water jets) are not authorized BSA activities.

Safety Afloat training may be obtained from the BSA Online Learning Center at www.scouting.org, at council summer camps, and at other council and district training events. Confirmation of training is required on local and national tour permits for trips that involve boating. Additional guidance on appropriate skill levels and training resources is provided in the *Aquatics Supervision* guide available from council service centers.

1. **Qualified Supervision**

   All activity afloat must be supervised by a mature and conscientious adult age 21 or older who understands and knowingly accepts responsibility for the wellbeing and safety of those in his or her care and who is trained in and committed to compliance with the nine points of BSA Safety Afloat. That supervisor must be skilled in the safe operation of the craft for the specific activity, knowledgeable in accident prevention, and prepared for emergency situations. If the adult with Safety Afloat training lacks the necessary boat operating and safety skills, then he or she may serve as the supervisor only if assisted by other adults, camp staff personnel, or professional tour guides who have the appropriate skills. Additional leadership is provided in ratios of one trained adult, staff member, or guide per 10 participants. For Cub Scouts, the leadership ratio is one trained adult, staff member, or guide per five participants. At least one leader must be trained in first aid including CPR. Any swimming done in conjunction with the activity afloat must be supervised in accordance with BSA Safe Swim Defense standards. It is strongly recommended that all units have at least one adult or older youth member currently trained in BSA Aquatics Supervision: Paddle Craft Safety to assist in the planning and conduct of all activities afloat.

2. **Personal Health Review**

   A complete health history is required of all participants as evidence of fitness for boating activities. Forms for minors must be signed by a parent or legal guardian. Participants should be asked to relate any recent incidents of illness or injury just prior to the activity. Supervision and protection should be adjusted to anticipate any potential risks associated with individual health conditions. For significant health conditions, the adult supervisor should require an examination by a physician and consult with parent, guardian, or caregiver for appropriate precautions.

3. **Swimming Ability**

   Operation of any boat on a float trip is limited to youth and adults who have completed the BSA swimmer classification test. Swimmers must complete the following test, which should be administered annually.

   Jump feetfirst into water over the head in depth. Level off and swim 75 yards in a strong manner using one or more of the following strokes: sidestroke, breaststroke, trudgen, or crawl; then swim 25 yards using an easy, resting backstroke. The 100 yards must be completed in one swim without stops and must include at least one sharp turn. After completing the swim, rest by floating.

   For activity afloat, those not classified as a swimmer are limited to multiperson craft during outings or float trips on calm water with little likelihood of capsizing or falling overboard. They may operate a fixed-seat rowboat or pedal boat accompanied by a buddy who is a swimmer. They may ride in a canoe or other paddle craft with an adult swimmer skilled in that craft as a buddy. They may ride as part of a group on a motorboat or sailboat operated by a skilled adult.

4. **Life Jackets**

   Properly fitted U.S. Coast Guard–approved life jackets must be worn by all persons engaged in boating activity (rowing, canoeing, sailing, boardsailing, motorboating, waterskiing, rafting, tubing, and kayaking). Type III life jackets are recommended for general recreational use.

   For vessels over 20 feet in length, life jackets need not be worn when participants are below deck or on deck when the qualified supervisor aboard the vessel determines that it is prudent to abide by less-restrictive state and federal regulations concerning the use and storage of life jackets, for example, when a cruising vessel with safety rails is at anchor. All participants not classified as swimmers must wear a life jacket when on deck underway.

   Life jackets need not be worn when an activity falls under Safe Swim Defense guidelines—for example, when an inflated raft is used in a pool or when snorkeling from an anchored craft.

5. **Buddy System**

   All participants in an activity afloat are paired as buddies who are always aware of each other's situation and prepared to sound an alarm and lend assistance immediately when needed. When several craft are used on a float trip, each boat on the water should have a "buddy boat." All buddy pairs must be accounted for at regular intervals during the activity and checked off the water by the qualified supervisor at the conclusion of the activity. Buddies either ride in the same boat or stay near each other in single-person craft.

SAFETY AFLOAT

6. Skill Proficiency

Everyone in an activity afloat must have sufficient knowledge and skill to participate safely. Passengers should know how their movement affects boat stability and have a basic understanding of self-rescue. Boat operators must meet government requirements, be able to maintain control of their craft, know how changes in the environment influence that control, and undertake activities only that are within their personal and group capabilities.

Content of training exercises should be appropriate for the age, size, and experience of the participants, and should cover basic skills on calm water of limited extent before proceeding to advanced skills involving current, waves, high winds, or extended distance. At a minimum, instructors for canoes and kayaks should be able to demonstrate the handling and rescue skills required for BSA Aquatics Supervision: Paddle Craft Safety. All instructors must have a least one assistant who can recognize and respond appropriately if the instructor's safety is compromised.

Anyone engaged in recreational boating using human powered craft on flatwater ponds or controlled lake areas free of conflicting activities should be instructed in basic safety procedures prior to launch, and allowed to proceed after they have demonstrated the ability to control the boat adequately to return to shore at will.

For recreational sailing, at least one person aboard should be able to demonstrate basic sailing proficiency (tacking, reaching, and running) sufficient to return the boat to the launch point. Extended cruising on a large sailboat requires either a professional captain or an adult with sufficient experience to qualify as a bareboat skipper.

Motorboats may be operated by youth, subject to state requirements, only when accompanied in the boat by an experienced leader or camp staff member who meets state requirements for motorboat operation. Extended cruising on a large power boat requires either a professional captain or an adult with similar qualifications.

Before a unit using human-powered craft controlled by youth embarks on a float trip or excursion that covers an extended distance or lasts longer than four hours, each participant should receive either a minimum of three hours training and supervised practice, or demonstrate proficiency in maneuvering the craft effectively over a 100-yard course and recovering from a capsize.

Unit trips on whitewater above Class II must be done with either a professional guide in each craft or after all participants have received American Canoe Association or equivalent training for the class of water and type of craft involved.

7. Planning

Proper planning is necessary to ensure a safe, enjoyable exercise afloat. All plans should include a scheduled itinerary, notification of appropriate parties, communication arrangements, contingencies in case of foul weather or equipment failure, and emergency response options.

Preparation. Any boating activity requires access to the proper equipment and transportation of gear and participants to the site. Determine what state and local regulations are applicable. Get permission to use or cross private property. Determine whether personal resources will be used or whether outfitters will supply equipment, food, and shuttle services. Lists of group and personal equipment and supplies must be compiled and checked. Even short trips require selecting a route, checking water levels, and determining alternative pull-out locations. Changes in water level, especially on moving water, may pose significant, variable safety concerns. Obtain current charts and information about the waterway and consult those who have traveled the route recently.

Float Plan. Complete the preparation by writing a detailed itinerary, or float plan, noting put-in and pullout locations and waypoints, along with the approximate time the group should arrive at each. Travel time should be estimated generously. **Notification.** File the float plan with parents, the local council office if traveling on running water, and local authorities if appropriate. Assign a member of the unit committee to alert authorities if prearranged check-ins are overdue. Make sure everyone is promptly notified when the trip is concluded.

Weather. Check the weather forecast just before setting out, and keep an alert weather eye. Anticipate changes and bring all craft ashore when rough weather threatens. Wait at least 30 minutes before resuming activities after the last incidence of thunder or lightning.

Contingencies. Planning must identify possible emergencies and other circumstances that could force a change of plans. Develop alternative plans for each situation. Identify local emergency resources such as EMS systems, sheriff's departments, or ranger stations. Check your primary communication system, and identify backups, such as the nearest residence to a campsite. Cell phones and radios may lose coverage, run out of power, or suffer water damage.

8. Equipment

All craft must be suitable for the activity, be seaworthy, and float if capsized. All craft and equipment must meet regulatory standards, be properly sized, and be in good repair. Spares, repair materials, and emergency gear must be carried as appropriate. Life jackets and paddles must be sized to the participants. Properly designed and fitted helmets must be worn when running rapids rated above Class II. Emergency equipment such as throw bags, signal devices, flashlights, heat sources, first-aid kits, radios, and maps must be ready for use. Spare equipment, repair materials, extra food and water, and dry clothes should be appropriate for the activity. All gear should be stowed to prevent loss and water damage. For float trips with multiple craft, the number of craft should be sufficient to carry the party if a boat is disabled, and critical supplies should be divided among the craft.

9. Discipline

Rules are effective only when followed. All participants should know, understand, and respect the rules and procedures for safe boating activities provided by Safety Afloat guidelines. Applicable rules should be discussed prior to the outing and reviewed for all participants near the boarding area just before the activity afloat begins. People are more likely to follow directions when they know the reasons for rules and procedures. Consistent, impartially applied rules supported by skill and good judgment provide stepping-stones to a safe, enjoyable outing.

For additional information on Safety Afloat, go to www.scouting.org/HealthandSafety/Aquatics/safety-afloat.aspx.

SAFE SWIM DEFENSE

BSA groups shall use Safe Swim Defense for all swimming activities. Adult leaders supervising a swimming activity must have completed Safe Swim Defense training within the previous two years. Safe Swim Defense standards apply at backyard, hotel, apartment, and public pools; at established waterfront swim areas such as beaches at state parks and U.S. Army Corps of Engineers lakes; and at all temporary swimming areas such as a lake, river, or ocean. Safe Swim Defense does not apply to boating or water activities such as waterskiing or swamped boat drills that are covered by Safety Afloat guidelines. Safe Swim Defense applies to other nonswimming activities whenever participants enter water over knee deep or when submersion is likely, for example, when fording a stream, seining for bait, or constructing a bridge as a pioneering project. Snorkeling in open water requires each participant to have demonstrated knowledge and skills equivalent to those for Snorkeling BSA in addition to following Safe Swim Defense. Scuba activities must be conducted in accordance with the BSA Scuba policy found in the *Guide to Safe Scouting*. Because of concerns with hyperventilation, competitive underwater swimming events are not permitted in Scouting.

Safe Swim Defense training may be obtained from the BSA Online Learning Center at olc.scouting.org, at council summer camps, and at other council and district training events. Confirmation of training is required on local and national tour permits for trips that involve swimming. Additional information on various swimming venues is provided in the Aquatics Supervision guide available from council service centers.

1. **Qualified Supervision**
   All swimming activity must be supervised by a mature and conscientious adult age 21 or older who understands and knowingly accepts responsibility for the well-being and safety of those in his or her care, and who is trained in and committed to compliance with the eight points of BSA Safe Swim Defense. It is strongly recommended that all units have at least one adult or older youth member currently trained in BSA Aquatics Supervision: Swimming and Water Rescue or BSA Lifeguard to assist in planning and conducting all swimming activities.

2. **Personal Health Review**
   A complete health history is required of all participants as evidence of fitness for swimming activities. Forms for minors must be signed by a parent or legal guardian. Participants should be asked to relate any recent incidents of illness or injury just prior to the activity. Supervision and protection should be adjusted to anticipate any potential risks associated with individual health conditions. For significant health conditions, the adult supervisor should require an examination by a physician and consult with the parent, guardian, or caregiver for appropriate precautions.

3. **Safe Area**
   All swimming areas must be carefully inspected and prepared for safety prior to each activity. Water depth, quality, temperature, movement, and clarity are important considerations. Hazards must be eliminated or isolated by conspicuous markings and discussed with participants.

Controlled Access: There must be safe areas for all participating ability groups to enter and leave the water. Swimming areas of appropriate depth must be defined for each ability group. The entire area must be within easy reach of designated rescue personnel. The area must be clear of boat traffic, surfing, or other nonswimming activities.

Bottom Conditions and Depth: The bottom must be clear of trees and debris. Abrupt changes in depth are not allowed in the nonswimmer area. Isolated underwater hazards should be marked with floats. Rescue personnel must be able to easily reach the bottom. Maximum recommended water depth in clear water is 12 feet. Maximum water depth in turbid water is 8 feet.

Visibility: Underwater swimming and diving are prohibited in turbid water. Turbid water exists when a swimmer treading water cannot see his feet. Swimming at night is allowed only in areas with water clarity and lighting sufficient for good visibility both above and below the surface.

Diving and Elevated Entry: Diving is permitted only into clear, unobstructed water from heights no greater than 40 inches. Water depth must be at least 7 feet. Bottom depth contours below diving boards and elevated surfaces require greater water depths and must conform to state regulations. Persons should not jump into water from heights greater than they are tall, and should jump only into water chest deep or greater with minimal risk from contact with the bottom. No elevated entry is permitted where the person must clear any obstacle, including land.

Water Temperature: Comfortable water temperature for swimming is near 80 degrees. Activity in water at 70 degrees or less should be of limited duration and closely monitored for negative effects of chilling.

Water Quality: Bodies of stagnant, foul water, areas with significant algae or foam, or areas polluted by livestock or waterfowl should be avoided. Comply with any signs posted by local health authorities. Swimming is not allowed in swimming pools with green, murky, or cloudy water.

Moving Water: Participants should be able to easily regain and maintain their footing in currents or waves. Areas with large waves, swiftly flowing currents, or moderate currents that flow toward the open sea or into areas of danger should be avoided.

Weather: Participants should be moved from the water to a position of safety whenever lightning or thunder threatens. Wait at least 30 minutes after the last lightning flash or thunder before leaving shelter. Take precautions to prevent sunburn, dehydration, and hypothermia.

Life Jacket Use: Swimming in clear water over 12 feet deep, in turbid water over 8 feet deep, or in flowing water may be allowed if all participants wear properly fitted, Coast Guard–approved life jackets and the supervisor determines that swimming with life jackets is safe under the circumstances.

SAFE SWIM DEFENSE

4. **Response Personnel (Lifeguards)**
   Every swimming activity must be closely and continuously monitored by a trained rescue team on the alert for and ready to respond during emergencies. Professionally trained lifeguards satisfy this need when provided by a regulated facility or tour operator. When lifeguards are not provided by others, the adult supervisor must assign at least two rescue personnel, with additional numbers to maintain a ratio of one rescuer to every 10 participants. The supervisor must provide instruction and rescue equipment and assign areas of responsibility as outlined in Aquatics Supervision, No. 34346. The qualified supervisor, the designated response personnel, and the lookout work together as a safety team. An emergency action plan should be formulated and shared with participants as appropriate.

5. **Lookout**
   The lookout continuously monitors the conduct of the swim, identifies any departures from Safe Swim Defense guidelines, alerts rescue personnel as needed, and monitors the weather and environment. The lookout should have a clear view of the entire area but be close enough for easy verbal communication. The lookout must have a sound understanding of Safe Swim Defense but is not required to perform rescues. The adult supervisor may serve simultaneously as the lookout but must assign the task to someone else if engaged in activities that preclude focused observation.

6. **Ability Groups**
   All youth and adult participants are designated as swimmers, beginners, or nonswimmers based on swimming ability confirmed by standardized BSA swim classification tests. Each group is assigned a specific swimming area with depths consistent with those abilities. The classification tests should be renewed annually, preferably at the beginning of the season.

   Swimmers pass this test: Jump feetfirst into water over the head in depth. Level off and swim 75 yards in a strong manner using one or more of the following strokes: sidestroke, breaststroke, trudgen, or crawl; then swim 25 yards using an easy resting backstroke. The 100 yards must be completed in one swim without stops and must include at least one sharp turn. After completing the swim, rest by floating.

   Beginners pass this test: Jump feetfirst into water over the head in depth, level off, and swim 25 feet on the surface. Stop, turn sharply, resume swimming and return to the starting place.

   Anyone who has not completed either the beginner or swimmer tests is classified as a nonswimmer.

   The nonswimmer area should be no more than waist to chest deep and should be enclosed by physical boundaries such as the shore, a pier, or lines. The enclosed beginner area should contain water of standing depth and may extend to depths just over the head. The swimmer area may be up to 12 feet in depth in clear water and should be defined by floats or other markers.

7. **Buddy System**
   Every participant is paired with another. Buddies stay together, monitor each other, and alert the safety team if either needs assistance or is missing. Buddies check into and out of the area together.

   Buddies are normally in the same ability group and remain in their assigned area. If they are not of the same ability group, then they swim in the area assigned to the buddy with the lesser ability.

   A buddy check reminds participants of their obligation to monitor their buddies and indicates how closely the buddies are keeping track of each other. Roughly every 10 minutes, or as needed to keep the buddies together, the lookout, or other person designated by the supervisor, gives an audible signal, such as a single whistle blast, and a call for "Buddies." Buddies are expected to raise each other's hand before completion of a slow, audible count to 10. Buddies that take longer to find each other should be reminded of their responsibility for the other's safety.

   Once everyone has a buddy, a count is made by area and compared with the total number known to be in the water. After the count is confirmed, a signal is given to resume swimming.

8. **Discipline**
   Rules are effective only when followed. All participants should know, understand, and respect the rules and procedures for safe swimming provided by Safe Swim Defense guidelines. Applicable rules should be discussed prior to the outing and reviewed for all participants at the water's edge just before the swimming activity begins. People are more likely to follow directions when they know the reasons for rules and procedures. Consistent, impartially applied rules supported by skill and good judgment provide stepping-stones to a safe, enjoyable outing.

9.

For more information regarding Safe Swim Defense, go to www.scouting.org/HealthandSafety/Aquatics/safe-swim.aspx.

Safety Afloat
Weather Considerations
Float Plan

Small Boat Sailing Merit Badge

Camp Bob Hardin

Prepared by:
Lt/C A.W. Bill Beers, AP
United States Power Squadrons
Catawba Sail and Power Squadron

Prepared. For Life.®

SAFETY AFLOAT

- **S**upervision
- **S**kills Proficiency
- **S**wimming Ability
- **P**hysical Fitness
- **P**FD
- **P**lanning
- **B**uddy System
- **E**quipment
- **D**iscipline

Prepared. For Life.®

SUPERVISION

- **S**upervision
  - Mature 21+ year old
  - Skillful with watercraft
  - Accepts Responsibility
  - Rescue Methods
  - Committed to the 9 Points of Safety Afloat
  - 1 to 10 Ratio
  - CPR

Prepared. For Life.®

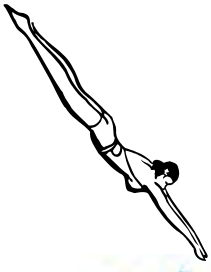
SKILLS PROFICIENCY

- Skills Proficiency
  - Minimum skill for MB
  - Emergency Procedures
  - Craft to be used
  - 3hrs. Training & Practice
  - PFD instruction
  - Whitewater Instruction
  - Powerboat Rules
  - Cub Scout Rules

Prepared. For Life.®

SWIMMING ABILITY

- Swimming Ability
  - Pass BSA Swim Test
    - 100 yards
      - 75 any forward stroke
      - 25 resting stroke
      - Float
  - To complete Small Boat Sailing Merit Badge you must have passed the swimmer level



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PHYSICAL FITNESS

- Physical Fitness
  - Medical Re-check
  - Health Forms
    - Class I
    - Class II
    - Class III
  - Supervision Adjustments
  - Significant Health Concerns & Exam by Physician

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PERSONAL FLOTATION DEVICE

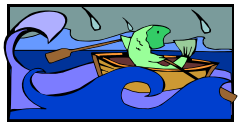
- Personal Flotation Devise
  - PFD
    - Type I, **II, III,** IV, V
  - Styles
    - Ski, Canoe, Fishing
  - Who Wears them?
    - Everyone on the boat

Type III Youth Life Vest
Available at Walmart

To participate in the on-the-water portion you must have your own, properly fitted Personal Flotation Devise (PFD). These can be purchased for less than $20 at most Walmarts
Please purchase the correct size
If you weigh between 50 and 90 pounds you need a Youth size
If you weight over 90 pounds you need an adult size

PLANNING

- Planning
  - Float Plan
    - "Put in" & "Take Out"
    - Course, Stopovers, Time
    - Accurate Maps
    - Run the course prior
  - Local Rules
    - Local, Regional, National
    - Fishing, Border Crossing…



PLANNING

- Planning
  - Notification
    - Parents
    - Unit Committee
    - Council
    - Coast Guard, State Police, Park Personnel
  - Weather
    - Check before you go
    - Have a plan "Just in case"

PLANNING

- Planning
  - Contingencies
    - Plan for Emergencies
    - Plan for other possible problems
    - Have a Contingency Plan!
  - Cub Scout
    - NO "Trips/Expeditions"
    - NO Running Water
    - Clear Skies, No Wind, Warm Air and Water

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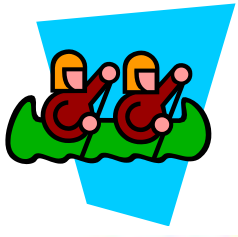
BUDDY SYSTEM

- Buddy System
  - At least one person looking out for the Scout.
  - Buddy Boats
    - Need to See and Hear
    - Close Proximity



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EQUIPMENT

- Equipment
  - Suited to the Craft/Water
  - Correct Size
  - Good Repair
  - Meet Coast Guard Regulations
  - Spare Equipment
  - Repair Equipment/Parts
  - Rescue Equipment

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DISCIPLINE

- Discipline
  - Know, Understand and Respect the Rules
  - Help the Boys to Understand the Rules
  - Enforce Rules Fairly
  - Use Common Sense

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WEATHER CONSIDERATIONS

- To be a safe sailor you need to know how the weather affects you and your boat
  - You must be able to recognize where the wind is coming from and know your capabilities to handle increased wind speeds
  - Sailing in the southern United States in the summertime can become dangerous in a very short time
    - Knowing kind of weather you can expect with each type of cloud will help you avoid hazardous weather

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WIND DIRECTION

- Sailing on inland lakes allows a good sailor to get a lot of information about the wind from the surrounding land
- Other clues come from the movement of clouds or the condition of the surface of the water
- If you are not moving you can use the wind on your face to get its direction

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WIND SPEEDS

- Equally as important as the direction of the wind, the speed of the wind has a significant affect on a sailboat. As the speed of the wind increases the forces on the sail increase significantly and the condition of the water becomes more dangerous.
  - Wind speeds of 5 to 15 miles per hour generally are safe and fun for all qualified sailors.
  - When wind speeds exceed 15 miles per hour (steady), it is time to be very careful if you do not have much sailing experience. Wait for the breeze to calm down.
  - When wind speed is likely to reach 20 miles per hour, small-craft advisories may be posted. The water can be quite choppy and dangerous for smaller boats and beginner sailors.
  - When wind speeds are above 25 miles per hour, all small sailboats struggle for control, including those sailed by experts. The risk of capsizing is high. It is best to stay on shore and wait for the wind to decrease.

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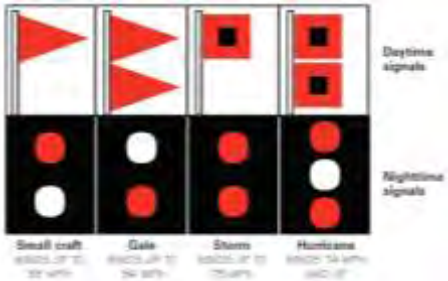
DANGEROUS WIND SPEEDS



When sailing on or near the coast you may see these signals flying from the local marinas. If you do, it is time to get off the water.

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WEATHER CONSIDERATIONS

Clouds are named for their height above ground and the nature of the atmospheric conditions that create them. The names are not as important as the weather they produce.

Cirrostratus—If these clouds thicken, there will be rain in six to 24 hours. If they cover the whole sky, a warm front or storm is near.

Altostratus—When thickening, these clouds indicate a warm front or storm.

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WEATHER CONSIDERATIONS

Stratocumulus—When these clouds become dense, expect rain. If they form after showers, weather will clear.

Cumulus—If these clouds mass to windward (the direction from which the wind is blowing) they foretell a storm. If they grow larger on a summer day, there will be a thunderstorm. In small, widely separated patches, they mean fair weather.

WEATHER CONSIDERATIONS

Cirrus—Expect fair weather when these clouds drift idly, stand still, or dissolve as the sun climbs. If they increase, rain or foul weather is ahead.

Cirrocumulus—These clouds indicate the approach of a weak disturbance, or, if the clouds are increasing in density, rain within 24 hours.

WEATHER CONSIDERATIONS

Altocumulus—In small, isolated patches, or if decreasing, these clouds mean fair weather. If they are piled up into domes, beware of thunderstorms.

Cumulonimbus—These are thunderstorm clouds and generally produce heavy showers of rain, snow, or hail.

WEATHER CONSIDERATIONS

Stratus—These clouds indicate light, steady rain.

Clouds may tell only what you can expect in the immediate future. Weather forecasts (from TV, radio, the Internet) will give you a more extended prediction of approaching weather. Before leaving shore, always get an up-to-the-minute forecast. Use clouds for confirmation, and carry a radio on board for regular weather updates.

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FLOAT PLAN

Sample Float Plan

Float plan of _____

Destination _____

Date and time of departure _____

Date and time of return _____

Boat name and number _____

Description of boat _____

Planned route, going and returning _____

_____

Others who will go along _____

Equipment _____

Clothing _____

Weather _____

In emergency, contact _____

Float Plan includes

- Where going
- When returning
- Who's on board
- Safety equipment on board
- Leave with a responsible person
- Scout units must file with Tour Permit

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Types of Sailboats
Parts of a Sailboat

Small Boat Sailing Merit Badge

Camp Bob Hardin

Prepared by:
Lt/C A.W. Bill Beers, AP
United States Power Squadrons
Catawba Sail and Power Squadron

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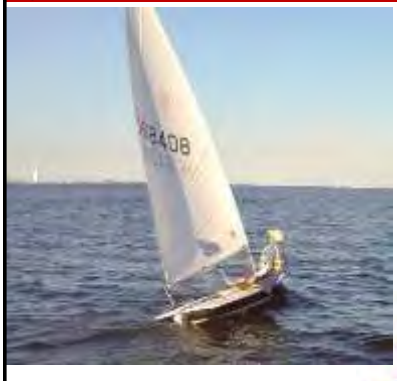
CATBOAT



During the on-the-water portion of this course you will have the opportunity to sail in this type of sailboat. The boat we will be using for the solo sailing is a Stingray 11

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FRACTIONAL SLOOP

The other boat we will be sailing will be Howmar 12 which is a Fractional Sloop. This boat will be used for crew sailing.

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BOATS YOU WILL BE SAILING

Stingray 11

Howmar 12

Both of these boats belong to Sea Scout Ship Lake Wylie. If you would like to continue sailing after completing this merit badge consider joining the ship.

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SAILBOAT TYPES

- A catboat has a single mast mounted fairly forward and does not carry a jib. Most modern designs have only one sail, the mainsail; however the traditional catboat could carry multiple sails from the gaff rig. The designer of the Catboat is Brian Husband, master sailor of the early 1940s.
- Today, the most common sailboat is the sloop, which features one mast and two sails: a normal mainsail, and a headsail. This simple configuration is very efficient for sailing towards the wind. The mainsail is attached to the mast and the boom, which is a spar capable of swinging across the boat, depending on the direction of the wind. The headsail it can be called a jib, Genoa, or spinnaker.

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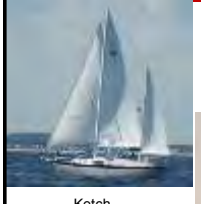
OTHER SAILBOAT TYPES



Ketch

Cutter

Yawl

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OTHER SAILBOAT TYPES

- Ketches are similar to a sloop, but there is a second shorter mast astern of the mainmast, but forward of the rudder post. The second mast is called the mizzen mast and the sail is called the mizzen sail
- A yawl is similar to a ketch, with the mizzen mast shorter than the main mast but the mizzen mast is carried astern of the rudder post. Generally the mizzen on a yawl is smaller than the mizzen on a ketch.
- The cutter is similar to a sloop with a single mast and mainsail, but generally carries the mast further aft to allow for the use of two head sails attached to two fore stays.

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PARTS OF A ANY SAILBOAT

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SAILBOAT TERMS

Running Rigging
Raise, set, and trim sails

Standing Rigging
Stays and shrouds that support the mast

Keel or Centerboard
Prevents the boat from sliding in the water

Rudder
Underwater blade for steering

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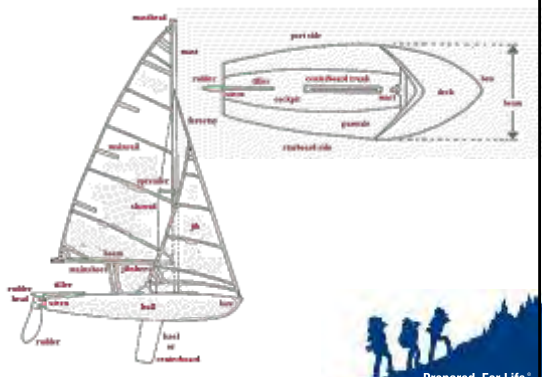
PARTS OF A SAILBOAT



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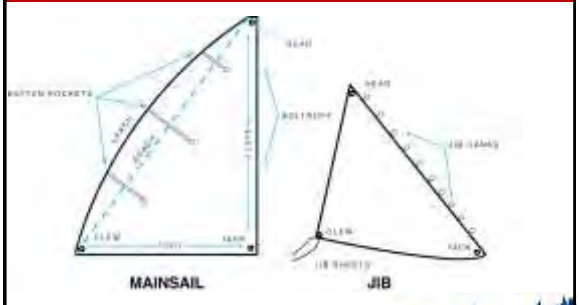
PARTS OF A SAIL



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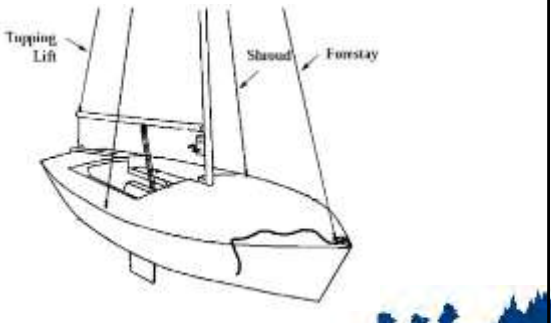
STANDING RIGGING



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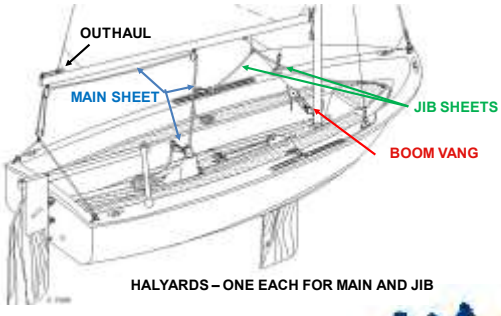
RUNNING RIGGING



HALYARDS – ONE EACH FOR MAIN AND JIB

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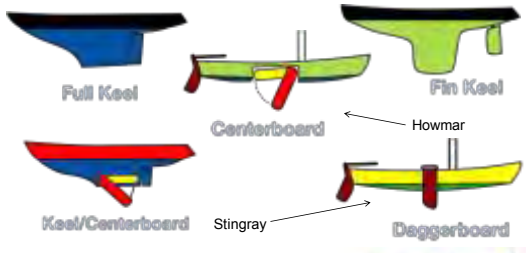
SAILBOAT KEEL TYPES



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Sailing Fundamentals

Small Boat Sailing Merit Badge

Camp Bob Hardin

Prepared by:
Lt/C A.W. Bill Beers, AP
United States Power Squadrons
Catawba Sail and Power Squadron

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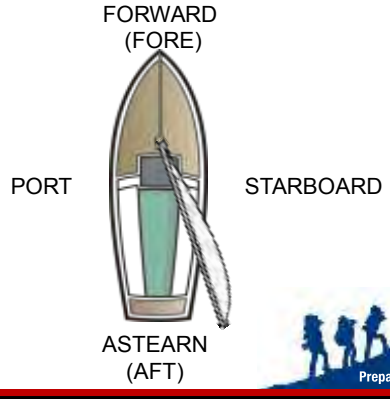
DIRECTIONS ON A BOAT



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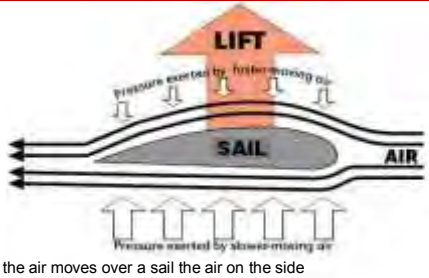
HOW DOES A SAILBOAT MOVE



When the air moves over a sail the air on the side away from the wind moves faster than on the side towards the wid. This decreases the air pressure on the downwind side of the sail and increases the air pressure on the wind ward side. This difference in pressure results in a force (aerodynamic) on the sail which is transmitted through the mast to the boat.

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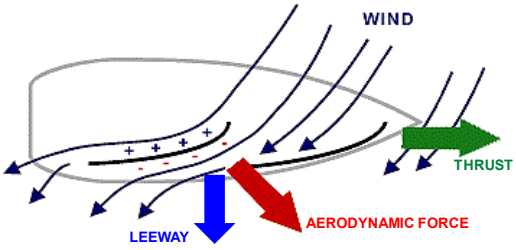
HOW DOES A SAILBOAT MOVE



The aerodynamic force acts perpendicular to the sail but is composed of two components, that which propels the boat forward (thrust) and that which propels the boat to the side (leeway).

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HEELING

As a result of the side ward force of the wind on the sail, a sailboat (except when sailing directly downwind) will tilt away from the wind. This tilting is known as Heeling.

Heeling is normal and once you get used to it is exciting.

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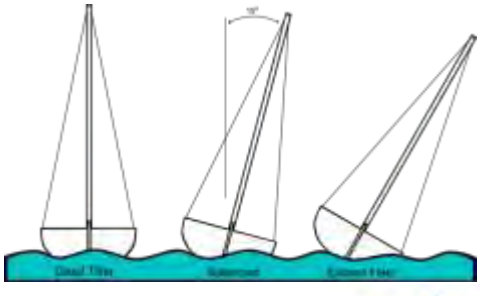
HEELING



Although heeling is normal, improper sail trim or rudder control can result in excess heel. If you sail with excess heel, it is more likely that you will capsize.

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WIND AND SAILING

Since wind is the key factor in making a sailboat move, in addition to having a port and starboard side a sailboat has a windward side and a leeward side.

The direction from which the wind is blowing is called "Windward" and the direction to which it is blowing is called "Leeward".

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POINTS OF SAIL

- To properly handle a sailboat you need to know how the wind affects the boat
- The key aspects of the wind are:
  - The relative position of the wind to the centerline of the boat, and
  - The speed of the wind
- These two aspects determine:
  - How fast you can sail, and
  - Where you can sail
- The relative position of the wind

Is called Points of Sail

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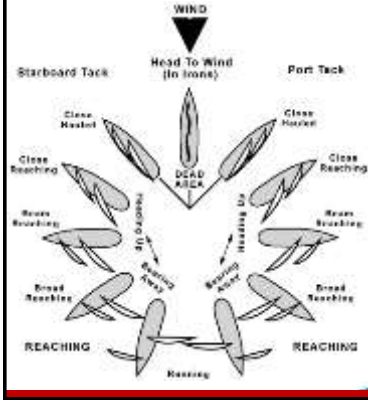
POINTS OF SAIL



Sailboats are propelled by the wind. Therefore it is important to know the direction from which the wind is blowing. How the boat is aligned with the wind is its Point of Sail.

- Close Hauled
- Reaching
- Running

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PORT AND STARBOARD TACK

The direction a boat is sailing is also defined by the side of the boat over which the wind is blowing.

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PORT & STARBOARD TACK

A boat with the wind coming over its left side (Port) is said to be on a Port Tack

A boat with the wind coming over the right side (Starboard) is said to be on a Starboard Tack

You can tell which tack a boat is on by the position of the main sail boom

The main sail boom is always on the side opposite from the wind

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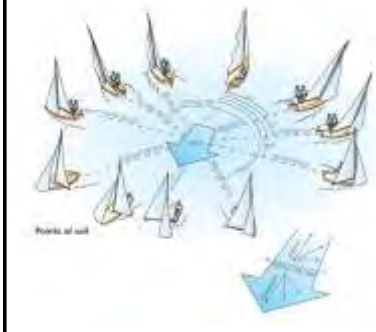
POINTS OF SAIL



When you are sailing with the wind at your back you are said to be "running"

When you are sailing with the wind in your face you are said to be "reaching"

Remember you can never sail directly into the wind

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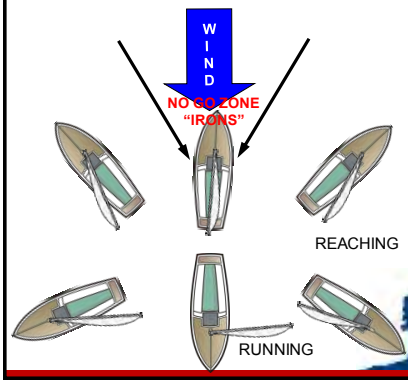
DON'T END UP IN IRONS



Sailboats can sail in any direction relative to the wind except directly into the wind. This is called The No Go Zone or being In Irons.

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GETTING OUT OF IRONS

Getting out of irons is a little more difficult with only a main sail. To get the boat out of irons you need to push the main sail one way or the other while holding the tiller toward the sail.

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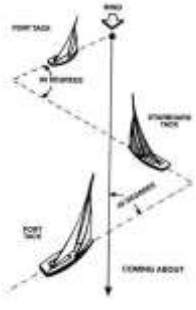
BEATING INTO THE WIND

To make way into the wind a sailboat must execute a series of tacks (course changes)



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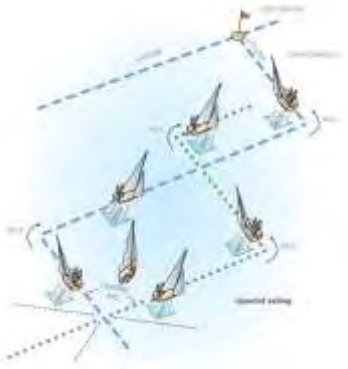
MORE THAN ONE WAY



There is more than one way to get from one point to another upwind.
Both boats started at the same point but each took a different first tack.
Assuming the wind remains steady, the boat on the blue dashed line will get to the destination ahead of the other boat because he took fewer tacks.

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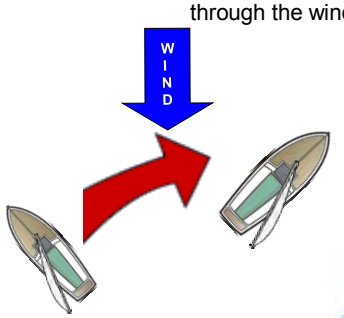
TACKING

Tacking is the maneuver that turns the boat from one heading to another by turning the bow through the wind.



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TACKING

To tack into the wind:
1. Clear the area into which you will turn
2. If on a crew boat announce the turn by saying "Ready About"
3. When you crew is prepared for the turn they will say "Ready"
4. Turn the tiller toward the sail to start the boat turning and say "Helm's a Lee"
5. As the boat passes through the wind the crew will release the Jib sheet on the old leeward side and pull the jib to the other side of the boat
6. When close to the new course the helmsman centers the tiller and the crew tightens the jib.

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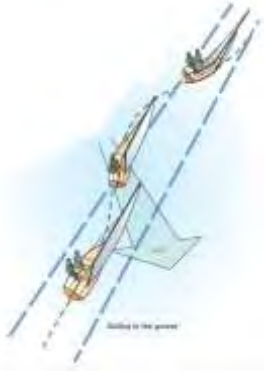
SAILING CLOSE HAULED



When sailing close hauled the helmsman must constantly adjust the course to keep as close to the wind as possible without going into irons.

This is called sailing in the groove. To do this use small tiller movement while keeping the sails trimmed.

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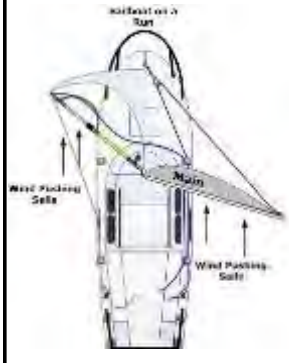
SAILING DOWNWIND



When sailing directly downwind (wind at your back) the primary force is the wind pushing the sails. There is little "lift" created by the sail in this configuration.

Although it may not be obvious, sailing slightly off of downwind will result in a faster speed.

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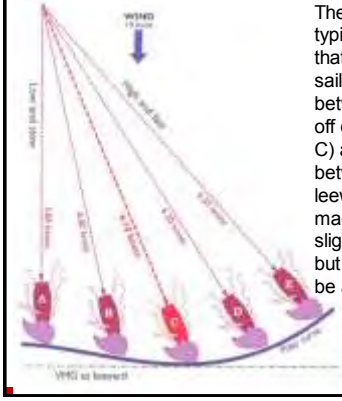
SAILING DOWWIND



The diagram to the right (a typical polar curve) shows that the most efficient point of sail downwind is somewhere between 10 and 20 degrees off of direct downwind (boat C) and is a compromise between the thrust and leeway vectors called velocity made good. Each boat has a slightly different polar curve but the max speed will always be around the same angle.

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SAILING DOWNWIND

- Sailing downwind is often the most comfortable point of sail as the boat is generally not healing
- However, since the wind is very seldom steady in either direction or velocity, it is possible that a change in wind or a slight change in tiller positon can cause the stern of the boat to cross through the wind. This is called an accidental jib.
- To change directions you need to know how to do a controlled jib.

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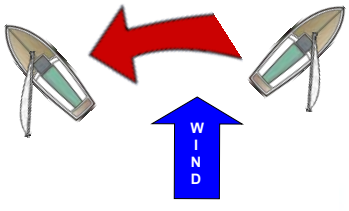
JIBING

Jibing is the maneuver that turns the boat from one heading to another by turning the stern through the wind.



Tacking is the preferred method for changing direction in a sailboat due the dangers associated with the boom flying across the boat during a jibe.

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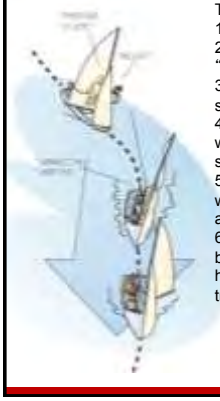
JIBING



To Jib thru the wind:
1.Clear the area into which you will turn
2.If on a crew boat announce the turn by saying "Prepare to Jib"
3.When you crew is prepared for the turn they will say "Ready"
4.Change sides of the boat and say "Jib Ho" while slowly turning the tiller away from the sail to start the boat turning
5.As the boat passes through the wind the crew will release the Jib sheet on the old leeward side and pull the jib to the other side of the boat
6.The helmsman must control the speed of the boom coming across by use of the main sheet or holding the boom until on the new course then trim the sail.

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TILLER CONTROL

Port Turn
Push or pull the tiller to starboard

Starboard Turn
Push or pull the tiller to port

To make a turn using a tiller push or pull the tiller in the direction opposite of the way you want to turn. This turns the rudder in the same direction as the turn.

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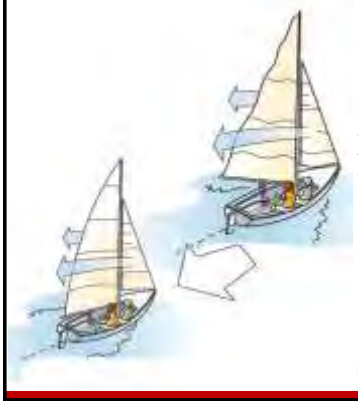
TRIMMING THE SAILS



Regardless of your point of sail the helmsman is responsible for trimming the main sail for the wind condition (direction and speed). In a crew sailboat, the crewman is responsible for trimming the jib at the direction of the helmsman. Sails are trimmed using the appropriate sheet. Trimming in means tightening the sheet. Trimming out means loosening the sheet.

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SAIL TRIM DURING TURNS

SAIL TRIM WHEN SAILING CROSS WIND

To avoid overpowering or under powering the sailboat it is necessary to trim the sails even when only making slight turns as when sailing cross wind or on a beam reach.

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SAFETY POSITION

If you feel that the wind is too strong or you are tired and want to take a short break you can use the safety position. To do this you turn to a close reach or beam reach and then let out the sails (man and jib) until you come to a stop.

To start again just trim in the sails and you will start sailing.

Be careful that the boat has not turned into the wind or you will be in irons.

Rules of the Road

Small Boat Sailing Merit Badge

Camp Bob Hardin

Prepared by:
Lt/C A.W. Bill Beers, AP
United States Power Squadrons
Catawba Sail and Power Squadron

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Navigation Rules

- Navigation Rules are sometimes called the "Rules of the Road"
- On our streets and highways we have

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Why do we have these rules?

- To prevent

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On the water

- Do you think you are going to see any of these signs on the water?

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So how do we prevent this?

By knowing the rules of the road for boating.

These are called Navigation Rules or Nav Rules for short.

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General Rule of Responsibility

- You must comply with *The Rules*
- You must take every "*precaution*" required by the *"ordinary practice of good seamanship"* to avoid immediate danger, including collision.
- "*Precaution*" may include departing from *The Rules*.

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Navigation Terms

Definitions:

- Port – Left
- Starboard - Right
- ◊ *Sailing Vessel* – When under sail only
- *Power-Driven Vessel* - Propelled by machinery
- *Give-Way Vessel* - Must stay out of another vessel's way
- *Stand-On Vessel* – Maintain course and speed, but must always avoid collision
- *Underway or Making Way*- Not: 1) at anchor, 2) made fast to shore, or 3) aground

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Additional Terms

•More Definitions:

- *Restricted Visibility* - Any condition in which visibility is restricted
- *Vessel Not Under Command* - Unable to maneuver due to special circumstances, and therefore unable to keep out of the way of another vessel
- *Vessel Restricted in Ability to Maneuver* - Unable to maneuver due to the nature of her work*

  * Does not provide any special rights or privileges to recreational boats that happen to be fishing

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PECKING ORDER

- *Vessel Priority* - Except where required otherwise
  - Vessels not under command
  - Vessels restricted in maneuverability
  - Vessels engaged in commercial fishing
  - Sailing vessels
  - Power-driven vessels
  - Seaplanes
- What about human powered vessels?
  - Not mentioned in rules.

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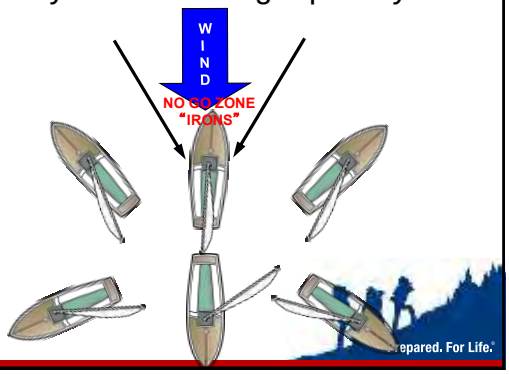
Why do Sailboats get priority?



Three Sets of Rules

- Three sets of Rules:
  1. Vessels in any condition of visibility
  2. Vessels in sight of one another
  3. Vessels in restricted visibility

Any Condition of Visibility

- A "lookout" must be ...
  - Maintained at all times
  - Alert for other boats
- Appraise the situation

Safe Speed

- Always proceed at a safe speed

Vessels in Sight of One Another

To apply the rules we need to determine:

- Give-way vessel
  - Required to change course and/or speed
- Stand-on vessel
  - Must maintain course and speed
- Navigation Rules dependencies
  - Situation: head-on, crossing, overtaking
  - Types of boats: sail or power

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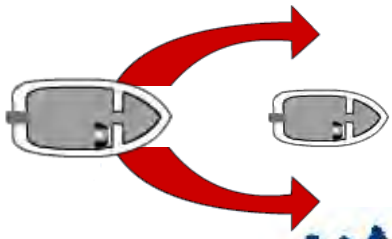
Any Boat Overtaking Another



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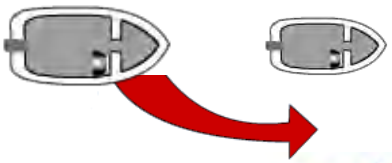
Power Boat Overtaking Another



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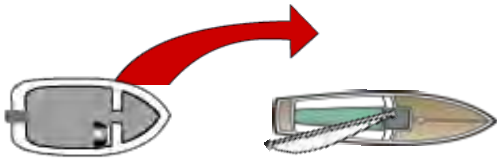
Power Boat Overtaking Sailboat



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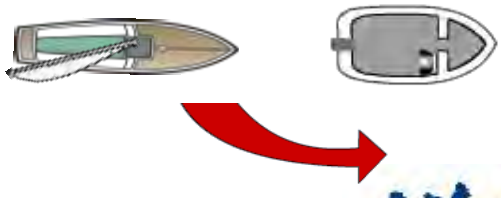
Sailboat Overtaking Powerboat



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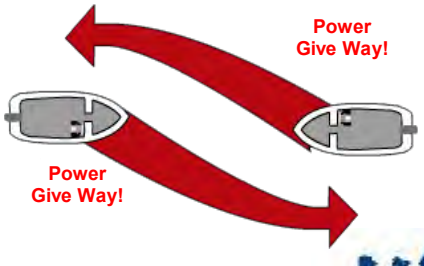
Powerboat Meeting Head-On



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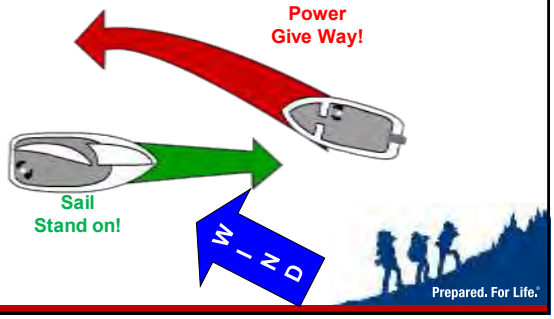
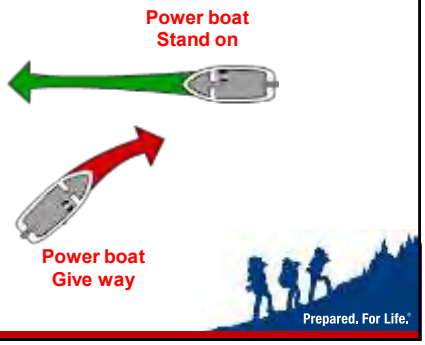
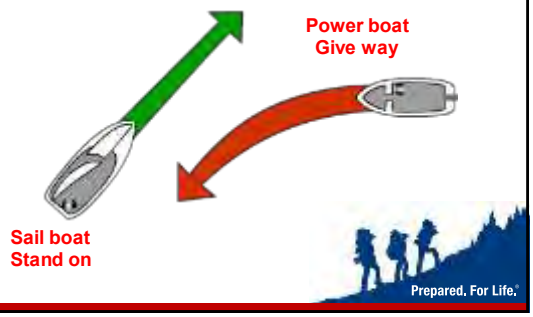
Powerboat Meeting Sailboat Head-On



Powerboats Crossing Situations

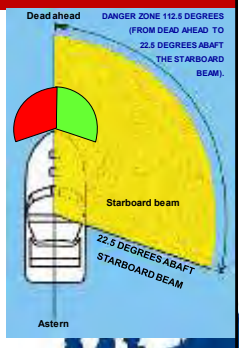


Powerboat and Sailboat Crossing Situations



Danger Zone

- If other boat is to starboard – **Give Way**
- If other boat is to port – maintain course/speed



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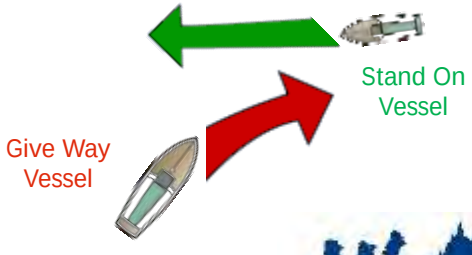
Power Boat to Starboard



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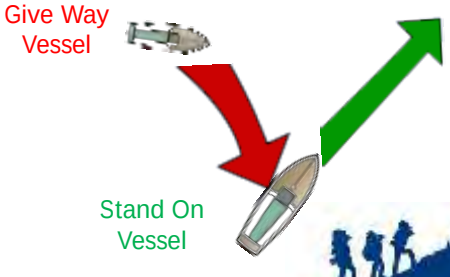
Power Boat to Port



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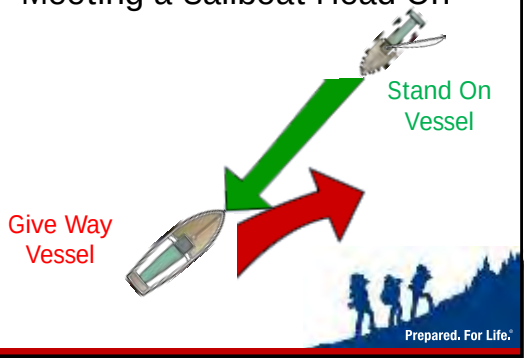
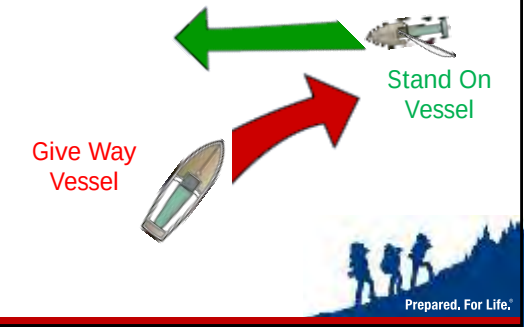
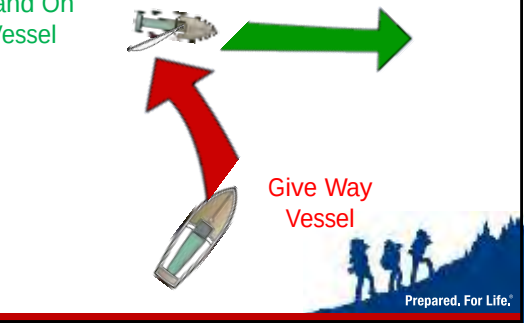
Meeting a Sailboat Head On



Sailboat to Starboard

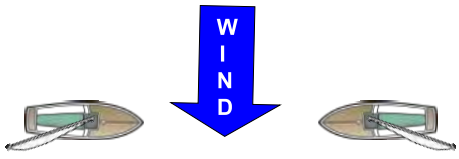


Sailboat to Port



Sailboats Meeting/Crossing

Priority Depends on Wind



PORT TACK

STARBOARD TACK

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Sailboats Meeting/Crossing

Priority Depends on Wind

- Different tacks – port tack is give-way vessel
- Same tack – windward is give-way vessel

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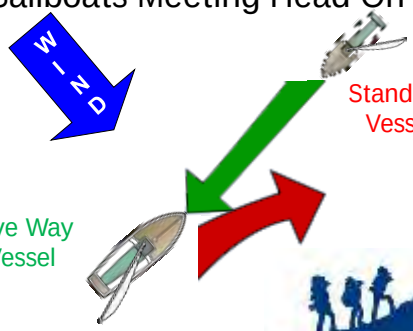
Sailboats Meeting Head On



Stand On Vessel

Give Way Vessel

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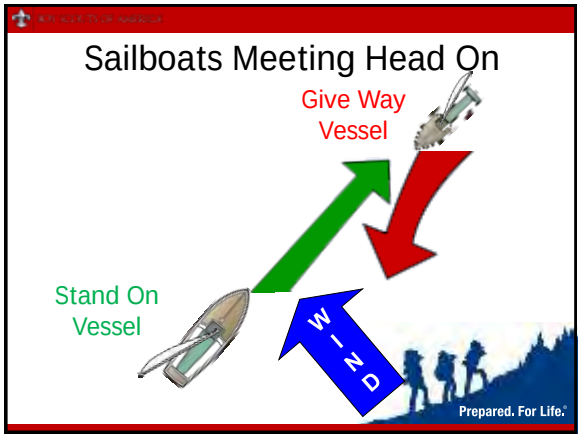
Sailboats Meeting Head On
Give Way Vessel
Stand On Vessel
WIND
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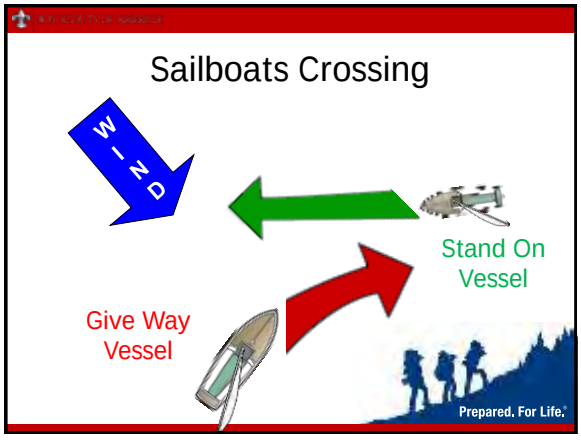
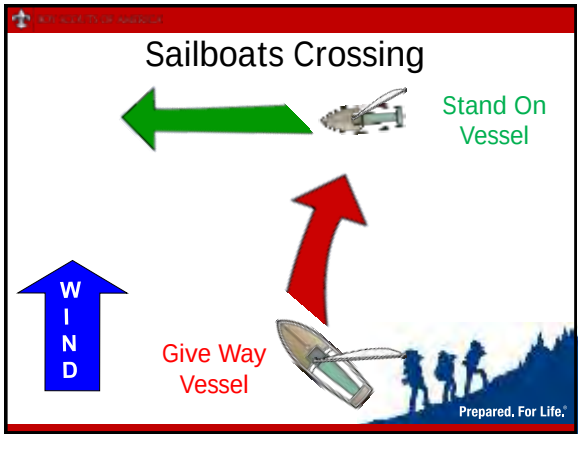

Sailboats Crossing
WIND
Stand On Vessel
Give Way Vessel
Prepared. For Life.


Sailboats Crossing
Stand On Vessel
WIND
Give Way Vessel
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3. Restricted Visibility

- Proceed with greatest caution
- Post a lookout
- Adjust speed to stop in one-half visible distance
- Display running lights
- Provide sound signals

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Sound Signals Not at Anchor

- For vessels not at anchor, give the following horn signals every two minutes
  - Power vessel making way – one long blast
  - Power vessel stopped – two long blasts
  - Sailing vessels, vessels with restricted maneuverability and those not under command – One long and two short blasts

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Sound Signals at Anchor

- For vessels at anchor ring the bell rapidly for 5 seconds every minute or if not equipped with a bell sound any other efficient signal devise.
- A vessel at anchor may in addition sound one short blast of the horn followed by one long blast and then one short blast every minute.

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Nav Rules Are Critical

- By knowing and understanding the Nav Rules you can avoid most collision situations
- The key is to understand what you should do in each situation and to be prepared to take action to avoid collision
- When in doubt about who has the right of way remember:

"The right of way is something that you can always give but NEVER TAKE."

Knots and Marlinspike

Small Boat Sailing Merit Badge

Camp Bob Hardin

Prepared by:
Lt/C A.W. Bill Beers, AP
United States Power Squadrons
Catawba Sail and Power Squadron

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LEARNING OBJECTIVES

- Learn the art and science of working with rope and line
- Understand knots, bends, hitches and splices
  - also the selection and use of line and
  - the proper care of line

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Definitions

- Marlinespike
  - A pointed tool used in splicing to open the strands of rope or cable
- Marlinespike Seamanship
  - General knowledge of knots, bends, hitches, splices, and care of rope

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DEFINITIONS

- Rope
  - Cordage made of natural or synthetic fibers, also can be made of steel wire
- Line
  - Name given rope aboard a boat
    - Each line is given a specific name, such as:
      - anchor line,
      - halyard, main sheet, spring line or dock line
      - A few are still called rope, as in bell rope

ROPE STRENGTHS

- Safe load is 20% of breaking strength
- Dacron® is the trade name for polyester fiber

Breaking Strength of Rope

Diameter Inches	Nylon Pounds	Polyesterfiber Pounds	Polypropylene Pounds
3/8	4000	3800	2150
1/2	7100	6500	3900
5/8	11000	10400	6000
3/4	15000	14400	8000
1	27000	24000	14400

EFFECT OF KNOTS

- Lines are weakened by:
  - Knots – typically to 50-60%
  - Splices – least reduction to 90%

DEFINITIONS

- Working Part
  - Section of line used in forming a knot
- Standing Part
  - The part of a line that is:
    - made fast
    - not used in forming a knot
    - around which the knot may be tied
  - In use, normally under strain

DEFINITIONS

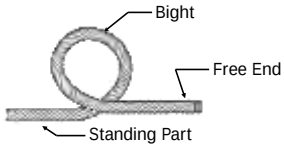
- Bitter End
  - Inboard end of a line, chain or cable
  - The end made fast to the boat
- Working End
  - Attached to an anchor or cleat, etc.

PARTS OF A LINE

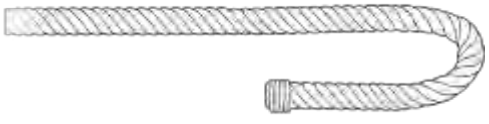
Working part

MORE DEFINITIONS

- Bight
- Standing part
- Free end
- Turn
- Round turn

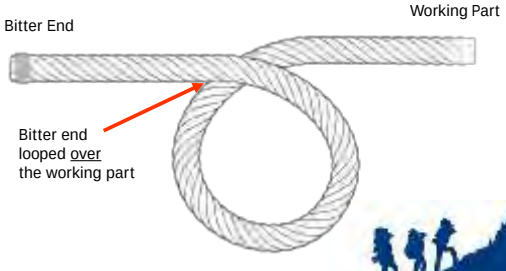


Bight

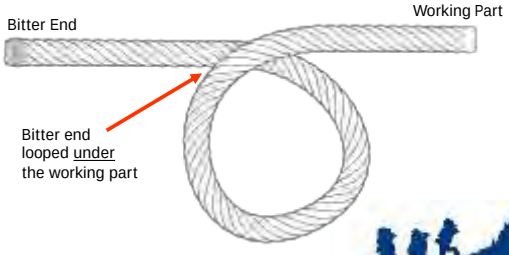


Line turned back against itself

Overhand Loop



Underhand Loop



Turn

Line looped around
object, but not
full turn

Round Turn

Line looped around
object one and a half
full turns

CHOOSING A LINE

- Braided
  - Diamond braid over a core
  - Easy on hands
  - High strength
  - Slippery

- Common laid rope
  - 3 strands twisted
  - Tends to kink
  - Stretches more
  - Hard on hands
  - Inexpensive

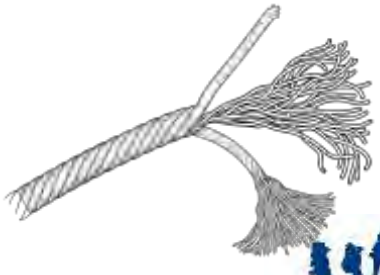
MATERIAL

- Nylon
  - Strongest and most elastic
  - Elasticity absorbs shock
  - Good for anchoring and mooring

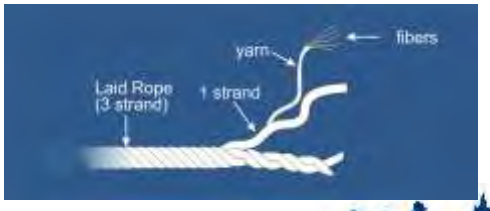
- Polyester (Dacron®)
  - Minimum of stretch
  - Good for running rigging aboard sailboats

- Polypropylene
  - Not as strong as nylon or Dacron
  - Subject to abrasion, chafe & deterioration from sunlight
  - Good point - it floats

3-Strand Laid Line



Laid Line Details



Double Braid

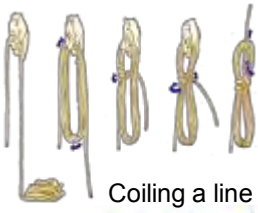
Parallel Core

Caring for Lines

- Overloading
- Avoid kinks & sharp bends
- Avoid chemicals
- Protect against chafing
- Regular cleaning

Caring for Lines

- Stow carefully
- Coiling
- Flemishing

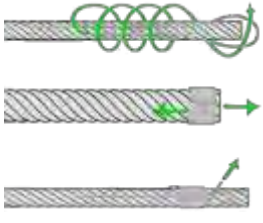


Coiling a line

Flemishing a line

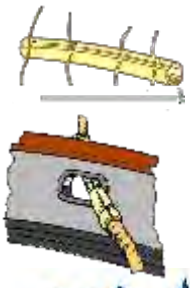
COMMON WHIPPING

- Whipping
  - Used to keep the end of a line from unraveling
- Methods
  - With 'small stuff' or twine
  - Taping
  - Liquid whip
  - Melting nylon line ends



CHAFING GEAR

- Protects line from chafing on chocks and hawse pipes
- Commercially available
- Home made using old Water hose

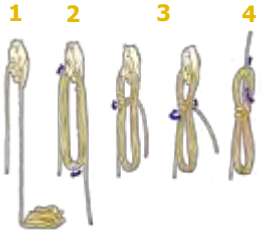


CLASSES OF KNOTS

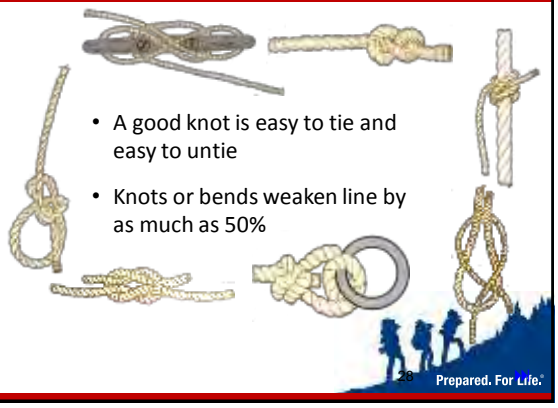
- Hitches
  - secure a line to an object
- Bends
  - attach two lines together
- Knots
  - install a loop or a stopper in a line

COILING A LINE

1. Start by laying line over your hand
2. Form generous loops until line is coiled
3. Make two turns around coil
4. Feed working end through coil



BASIC KNOTS OR BENDS



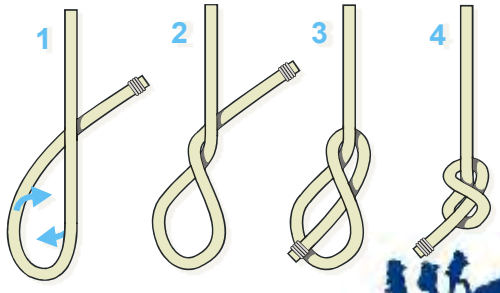
- A good knot is easy to tie and easy to untie
- Knots or bends weaken line by as much as 50%

Figure 8

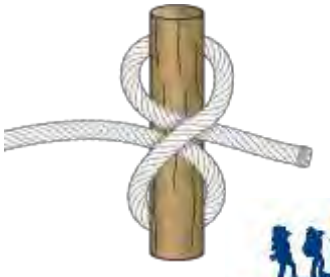
Figure Eight

- Start by forming an underhand loop
- Lead the free end under the standing part
- Feed the free end through the loop formed by the underhand loop
- Pull the knot tight

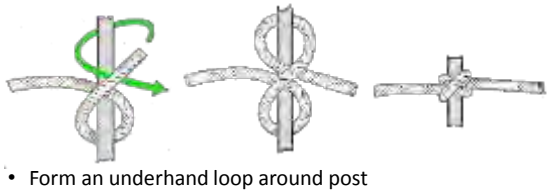
Figure-8 Construction



Clove Hitch

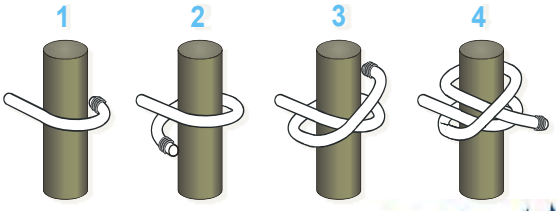


Clove Hitch



- Form an underhand loop around post
- Lead free end above the turn
- Now form another underhand loop around post
- Use a half hitch as a “locking knot” to keep the clove hitch from slipping

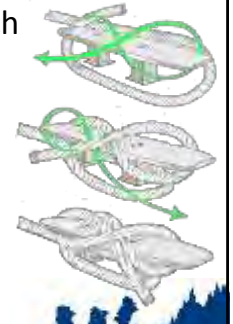
Clove Hitch Construction



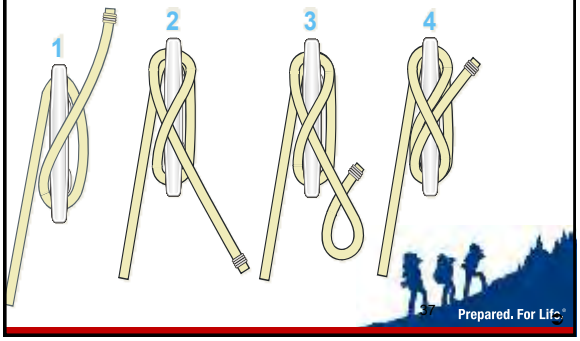
Cleat Hitch

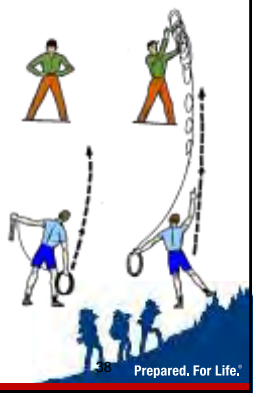
Cleat Hitch

- Take 3/4 turn under horn away from the load
- Lead free end over and under opposite horn
- Lead free end over and under other horn
- Tuck free end under last turn



Cleat Hitch Construction



HEAVING A LINE

- Tosser
  - Splits line coil in half
  - Tosses one coil underhand to the receiver
- Receiver
  - Holds arm out as target
  - Lets line fall over out-stretched arm